AIR FORCE

QUALIFICATION TRAINING PACKAGE (AFQTP)

FOR

UTILITIES SYSTEMS

(3E4X1)

MODULE 27

AFSC SPECIFIC CONTINGENCY RESPONSIBILITIES

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MODULE 27

AFSC SPECIFIC CONTINGENCY RESPONSIBILITIES

Career Field Education and Training Plan (CFETP) references from 1 Jul 02 version.

OPR: HQ AFCESA/CEOF
(SMSgt James B. Lucas)
Supersedes AFQTP 3E4X1-26, 1 Oct 1999

Certified by: HQ AFCESA/CEOF
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Pages: 43/Distribution F

AIR FORCE QUALIFICATION TRAINING PACKAGES
FOR
UTILITIES SYSTEMS
(3E4X1)

INTRODUCTION

Before starting this AFQTP, refer to and read the "AFQTP TRAINER/TRAINEE GUIDE."

AFQTPs are mandatory and must be completed to fulfill task knowledge requirements on core and diamond tasks for upgrade training. ***It is important for the trainer and trainee to understand*** that an AFQTP ***does not*** replace hands-on training, nor will completion of an AFQTP meet the requirement for core task certification. AFQTPs will be used in conjunction with applicable technical references and hands-on training.

AFQTPs and Certification and Testing (CerTest) must be used as minimum upgrade requirements for Diamond tasks.

MANDATORY minimum upgrade requirements:

Core task:
AFQTP completion
Hands-on certification

Diamond task:
AFQTP completion
CerTest completion (80% minimum to pass)

Note: *Trainees will receive hands-on certification training for Diamond Tasks when equipment becomes available either at home station or at a TDY location*.

Put this package to use. Subject matter experts under the direction and guidance of HQ AFCESA/CEOF revised this AFQTP. If you have any recommendations for improving this document, please contact the Career Field Manager at the address below.

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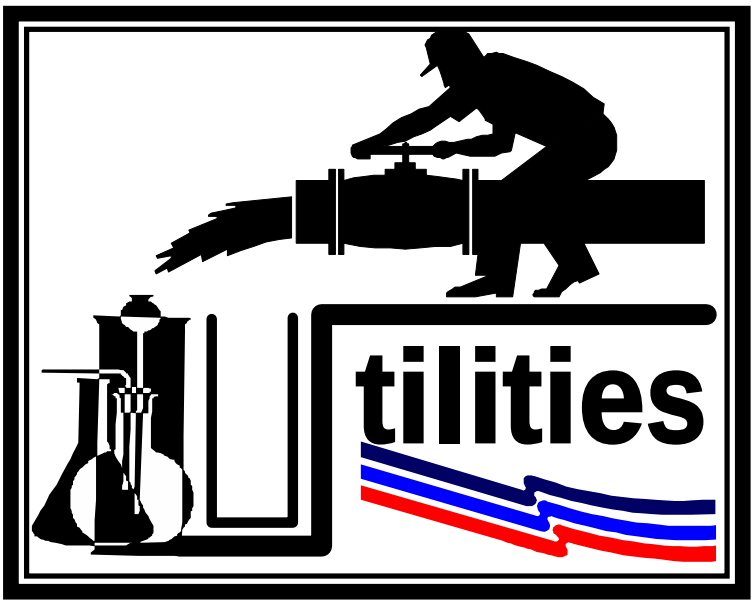
Notice. This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.



EXPEDIENT BEDDOWN

HARVEST EAGLE (HE) WATER DISTRIBUTION SYSTEM

MODULE 27 **AFQTP UNIT 3**

SET UP (27.3.1.1.2.)

TROUBLESHOOTING (27.3.1.1.3.)

REPAIRS (27.3.1.1.4.)

Notice. This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

SET UP / TROUBLESHOOTING / REPAIRS OF THE HE WATER DISTRIBUTION SYSTEM

Task Training Guide

STS Reference Number/Title:	27.3.1.1.2., Set up of HE water distribution system. 27.3.1.1.3., Troubleshooting HE water distribution system. 27.3.1.1.4., Repairs of HE water distribution system.
Training References:	1. CD-ROM, Air Force Qualification Training Package (AFQTP) 3E4X1, Utilities Systems, Version 1.0, May 98: *Harvest Eagle Water Distribution System*. 2. Technical Order (T.O.) 40W4-14-1, Harvest Eagle Water Distribution System. 3. Harvest Eagle (HE) Water System Video Pin # 612060. 4. Air Force Pamphlet (AFPAM) 10-219, Vol. 5: *Bare Base Conceptual Planning Guide*.
Prerequisites:	1. **Possess as a minimum a 3E431 AFSC.** 2. **Review the following references:** 2.1. T.O. 40W4-14-1. 2.2. AFPAM 10-219, Vol. 5. 2.3. HE Water System Video Pin # 612060. 3. **Complete CD-ROM, AFQTP 3E4X1, Utilities Systems, Version 1.0, May 98: *Harvest Eagle Water Distribution System.***
Equipment/Tools Required:	1. Computer for CD-ROM AFQTP. 2. Raw water component kit. 3. Potable water component kit. 4. Wastewater component kit.
Learning Objective:	Trainee will have basic knowledge on setting up, troubleshooting, and repair of the Harvest Eagle (HE) Water Distribution System.
Samples of Behavior:	Trainee will know the required steps in setting up, troubleshooting, and repairs of the HE Water Distribution System.

Notes:

1. To successfully complete this element, the steps must be followed exactly--no exceptions.
2. Any safety violation is an automatic failure.
3. You **must** follow the detailed procedures in T.O. 40W4-14-1, *Harvest Eagle Water Distribution System,* when setting up, troubleshooting, and repairing. The number of systems, subsystems, and individual components requires specific step-by-step procedures when unpacking and assembling, troubleshooting, and repairing the HE distribution kits.

SET UP / TROUBLESHOOTING / REPAIRS OF THE HE WATER DISTRIBUTION SYSTEM

1. Background: The importance of providing a potable source of water to deployed troops is self-evident. It is vital that this water is provided quickly and in large enough quantities to support the deployed forces and provide a dependable reserve supply. A single Harvest Eagle (HE) water system provides a 550-person encampment with a supply of water (average of 20 gallons per person per day) for drinking, cooking, bathing, and laundry. The basic system is composed of water treatment, storage, and distribution and wastewater (gray water) collection for field latrines, showers, laundries, and kitchens. (See Figure 1.)

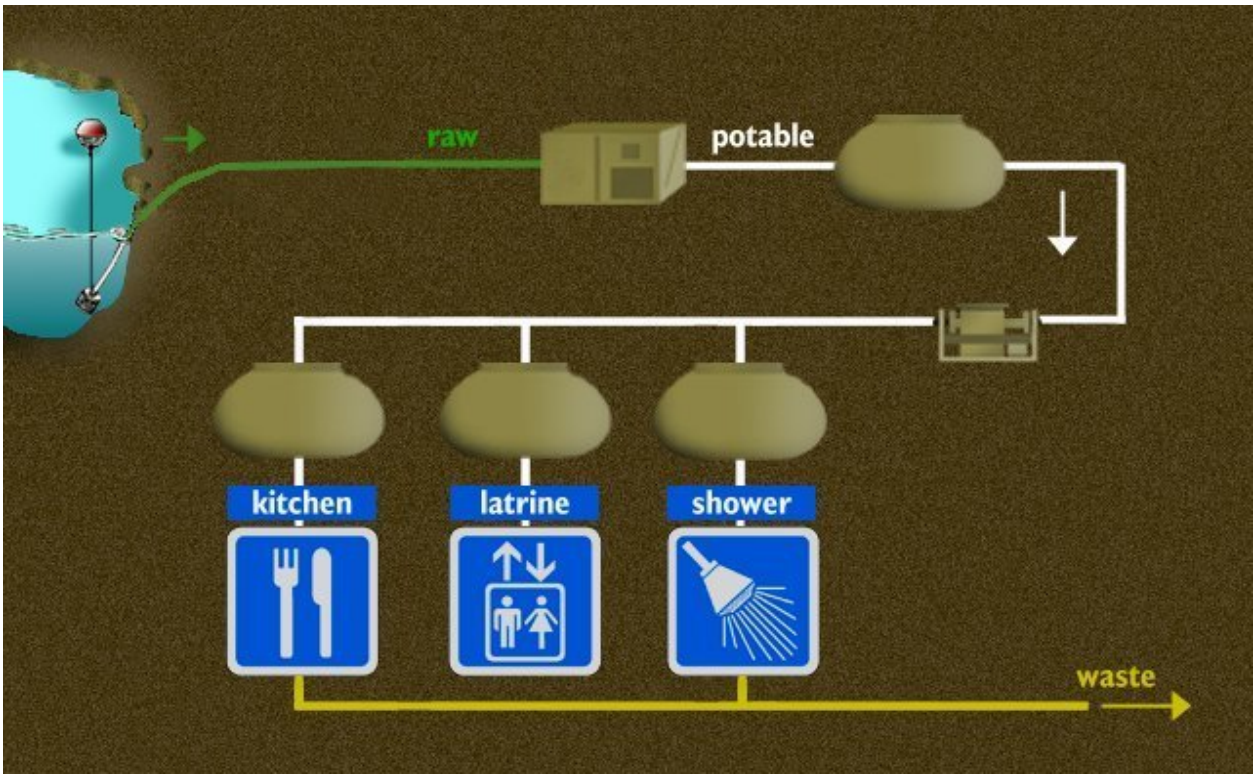


Figure1. Harvest Eagle Water Distribution System

1.1. <u>Set Up</u>. The Harvest Eagle water distribution system is set up from four major kits:

1.1.1. Raw Water Component Kit.

1.1.2. Potable Water Component Kit.

1.1.3. Wastewater Component Kit.

1.1.4. HE Water Distribution System Accessory Kit.

1.1.5. The basic components are:

1.1.5.1. 190 feet of 4” raw water hose.

1.1.5.2. 5100 feet of 2” raw water hose.

1.1.5.3. 160 feet of 4” potable water hose.

1.1.5.4. 2370 feet of 2” potable water hose.

1.1.5.5. 150 feet of 1.5” potable water hose.

1.1.5.6. 1400 feet of 2" wastewater hose.

1.1.5.7. 2 – 3000-gallon storage bladder for raw water.

1.1.5.8. 6 – 3000 gallon storage bladder for potable water.

1.1.5.9. 2 – 10,000 gallon bladder for potable water.

1.1.5.10. 2 – 125 gallon per-minute (gpm) raw water pumps.

1.1.5.11. 4 – 125 gpm potable water pumps.

1.1.5.12. 2 – 35 gpm wastewater pumps.

1.1.5.13. 1 – Reverse Osmosis Purification Unit (ROWPU).

1.1.5.14. 1 – Hypochlorinator.

1.2. <u>Troubleshooting and Repair</u>. For the most part, the HE Water Distribution System will operate with few problems (if maintained properly); however, "Murphy's Law", or "what can go wrong will go wrong", must be considered in the same breadth of mechanical equipment.

1.2.1. Since troubleshooting is a step-by-step procedure, the effectiveness depends on how much you know about the equipment and how much you think while working. The ability to troubleshoot depends on your capability to think and apply knowledge. To troubleshoot effectively, you must follow a systematic procedure. First, study the symptoms of the trouble thoroughly and ask yourself these questions:

1.2.1.1. What were the warning signs preceding the trouble?

1.2.1.2. What recent repair has been done?

1.2.1.3. Has a similar trouble occurred before?

1.2.2. Next, follow the basic troubleshooting process:

1.2.2.1. Perform an operational check.

1.2.2.2. Analyze the malfunction.

1.2.2.3. Locate the malfunction.

1.2.2.4. Perform corrective action (repair/replace).

1.2.2.5. Perform an operational check.

2. Complete the CD-ROM AFQTP 3E4X1 Utilities Systems, Version 1.0, May 98: *Harvest Eagle Water Distribution System* for detailed instruction on set up, troubleshooting, and repairs for the HE water distribution system. ***After completing the CD-ROM AFQTP see your Unit Education and Training Manager to take the <u>mandatory</u> CerTest #8079, Harvest Eagle Water Distribution System. Trainee must score at least 80% to meet the minimum completion requirement for diamond tasks.***

> **NOTE:**
> The review questions for this material are in the above-mentioned CD-ROM.

3. If equipment is available, then perform the following for hands-on certification training.

3.1. <u>Set Up HE Water Distribution System</u>.

Step 1: Locate T.O. 40W4-14-1, Harvest Eagle Water Distribution System.

Step 2: Assembling raw water kit components:

2.1. Assemble bubbler assembly (if operating in freezing weather) in accordance with (IAW) T.O. 40W4-14-1, Chapter 3, Paragraph 3-12.

2.2. Assemble source raw water suction hose IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-13.

2.3. Assemble heat tracing kit (if operating in freezing weather) IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-14.

2.4. Assemble 125 gpm pump connection kits IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-15.

Step 3: Assembling potable water kit components:

3.1. Assemble 10,000-gallon water tanks IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-17.

3.2. Assemble 125 gpm pump connection kits IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-18.

3.3. Assembly 10k water tank connection kits IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-19.

3.4. Assemble hose nozzle connection kits IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-20.

3.5. Assemble loading station connection kits IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-21.

3.6. Assemble facilities distribution kits IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-22.

Step 4: Assembling wastewater kit components:

4.1. Assemble waste disposal units IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-24.

Step 5: Assembling HE water distribution system accessory kit components:

5.1. Assemble water heater accessory kits (if operating in freezing weather) IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-26.

Step 6: Installing the raw water subsystem:

6.1. Install bubbler assembly (if operating in freezing weather) IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-30.

6.2. Install hose assemblies and pump connection kits IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-31.

6.3. Verify raw water subsystem installation IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-32.

Step 7: Installing the potable water subsystem:

7.1. Install 125 gpm pumps, tank connection kits, and back pressure regulators IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-34.

7.2. Install hypochlorination unit and discharge hoses IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-35.

7.3. Install nozzle connections, station loading, and facility distribution kits IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-36.

7.4. Verify portable water subsystem installation IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-37.

Step 8: Installing the wastewater subsystem:

8.1. Install wastewater component kit IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-39 and 3-40.

8.2. Verify wastewater subsystem installation IAW T.O. 40W4-14-1, Chapter 3, Paragraph 3-41.

Step 9: Installing the HE water distribution accessory kit.

9.1. Install water heater accessory kits (if operating in freezing weather) IAW T.O. 40W4-14-1, Chapter 3, Paragraphs 3-43 and 3-44.

9.2. Install Harvest Falcon (HF) connector kits (if required) IAW T.O. 40W4-14-1, Chapter 3, Paragraphs 3-43 and 3-45.

9.3. Install 10k gallon water distribution kits IAW T.O. 40W4-14-1, Chapter 3, Paragraphs 3-43 and 3-46.

3.2. Troubleshooting HE Water Distribution System.

NOTE TO TRAINER:
In order for the trainee to accomplish this task, you must build an exercise scenario using the troubleshooting charts 5-5 through 5-11 in T.O. 40W4-14-1. Then have the trainee identify the probable cause and remedy for the trouble.

Step 1: Trainee is provided equipment and problem scenario in which to perform task.

Step 2: Use five-step process in troubleshooting: (Use the troubleshooting charts 5-5 through 5-11 in T.O. 40W4-14-1 as a guide).

2.1. Perform an operational check.

2.2. Analyze the malfunction.

2.3. Locate the malfunction.

2.4. Perform corrective action.

2.5. Perform an operational check.

3.3. Repairing HE Water Distribution System Components.

NOTE TO TRAINER:
In order for the trainee to accomplish this task, you must build an exercise scenario using the repair, removal, and installation procedures (paragraphs 5-16 through 5-69 in T.O. 40W4-14-1. Then have the trainee perform the repair.

Step 1: Trainee is provided equipment and problem scenario in which to perform task.

Step 2: Perform the repair using the step-by-step procedures in T.O. 40W4-14-1, Chapter 3, Paragraph 5-16 through 5-69.

SET UP / TROUBLESHOOTING / REPAIRS OF THE HE WATER DISTRIBUTION SYSTEM

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE….?	YES	NO
Set Up of the HE Water Distribution System		
1. Assemble the raw water kit components IAW T.O. 40W4-14-1		
2. Assemble the potable water kit components IAW T.O. 40W4-14-1		
3. Assemble the wastewater kit components I/A/W T.O. 40W4-14-1		
4. Assemble the HE water distribution system accessory kit components IAW T.O. 40W4-14-1		
5. Install the raw water subsystem IAW T.O. 40W4-14-1		
6. Install the potable water subsystem IAW T.O. 40W4-14-1		
7. Install the wastewater subsystem IAW T.O. 40W4-14-1		
8. Install the HE water distribution system accessory kit components IAW T.O. 40W4-14-1		
9. Comply with all safety requirements?		

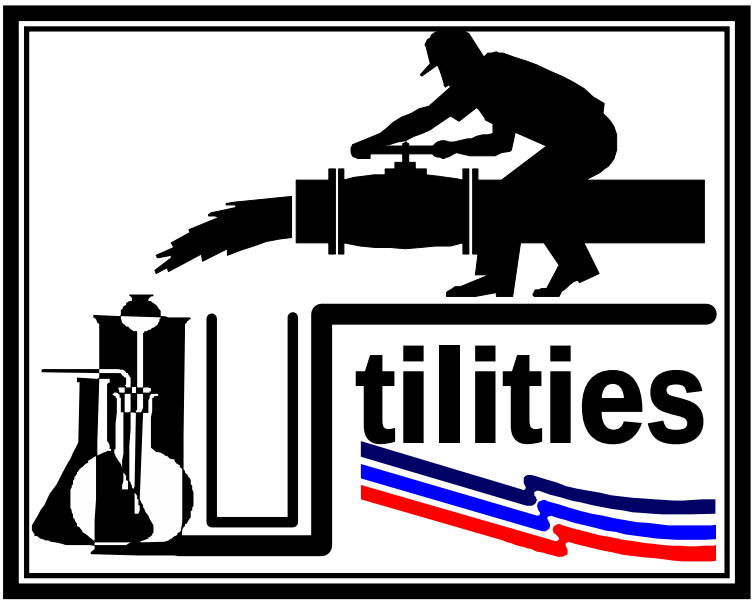
FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

NOTE TO TRAINER:

In order for the trainee to accomplish these tasks, you must build an exercise scenario using the troubleshooting charts and repair procedures in T.O. 40W4-14-1. Then have the trainee identify the problem and perform the correct repair/replace procedure IAW the technical order.

DID THE TRAINEE….?	YES	NO
Troubleshooting and Repairs of the HE Water Distribution System.		
1. Check the maintenance record of the equipment		
2. Did trainee perform the five basic steps in troubleshooting: 2.1. Perform operational check 2.2. Analyze malfunction 2.3. Locate malfunction 2.4. Perform corrective action 2.5. Perform operational check		
3. Repair/replace the malfunction component IAW T.O. 40W4-14-1		
4. Comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.



EXPEDIENT BEDDOWN METHODS

PORTABLE SHOWER UNIT & SHAVE STAND

MODULE 27 **AFQTP UNIT 3**

SET UP (27.3.2.4.1.)

PERFORM OPERATIONAL TESTS (27.3.2.4.2.)

SERVICE/PERIODIC MAINTENANCE (27.3.2.4.3.)

TROUBLESHOOTING (27.3.2.4.4.)

REPAIRS (27.3.2.4.5.)

Notice. This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

SET UP / PERFORM OPERATIONAL TESTS / SERVICE/PERIODIC MAINTENANCE / TROUBLESHOOT / REPAIRS OF THE PORTABLE SHOWER UNIT & SHAVE STAND

Task Training Guide

STS Reference Number/Title:	27.3.2.4.1., Set up. 27.3.2.4.2., Perform operational tests. 27.3.2.4.3., Service/Periodic maintenance. 27.3.2.4.4., Troubleshoot. 27.3.2.4.5., Repairs.
Training References:	1. CD-ROM, Air Force Qualification Training Package (AFQTP) 3E4X1, Utilities Systems, Version 1.0, Jul 01: *Shower and Shave Unit*. 2. CD-ROM AFQTP 3E4X1, Utilities Systems, Version 1.0, Feb 98: *Bath Unit and Shower Facility (Portable Shower Unit (M1958) and (PBU100)).* 3. CD-ROM AFQTP 3E1X1, Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC/R), Version 1.0, 1 Feb 98: *M-80 Field Boiler.* 4. Technical Order (T.O.) 35E35-3-1, Erection, Operation, Storage, Inspection & Maintenance Instructions, *Shave Stand Bare Base (P/N 8611370).* 5. T.O. 35E35-4-1, Erection, Operation, Storage, Inspection & Maintenance Instructions, *Shower Facility Bare Base (P/N 8611305)*. 6. T.O. 40P1-6-2-1 (Army TM 10-4510-206-14), *Bath Unit, Portable Automated Multi-head Model PBU100.* 7. T.O. 40P1-2-2-1 (Army TM 10-4510-201-14), *Bath Unit, Portable, 8 Shower Head M1958.* 8. T.O. 35E7-4-27-1 (Marine Corps TM 08444A-15/1), M-80 Boiler. 9. Air Force Pamphlet (AFPAM) 10-219, Volume 5: *Bare Base Conceptual Planning Guide*.
Prerequisites:	1. **Possess as a minimum a 3E431 AFSC.** 2. **Review the following references:** 2.1. T.Os. 35E35-3-1, 35E35-4-1, 40P1-6-2-1, 40P1-2-2-1, and 35E7-4-27-1. 2.2. AFPAM 10-219, Vol. 5. 2.3. CD-ROM AFQTP 3E4X1, Utilities Systems, Version 1.0, Feb 98: *Bath Unit and Shower Facility (Portable Shower Unit (M1958) and (PBU100)).* 2.4. CD-ROM AFQTP 3E1X1, Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC/R), Version 1.0, 1 Feb 98: *M-80 Field Boiler.* 3. **Complete CD-ROM AFQTP 3E4X1, Utilities Systems, Version 1.0, Jul 01: *Shower and Shave Unit.***

TASK TRAINING GUIDE (Continued)

Equipment/Tools Required:	1. Computer to support CD-ROM AFQTP. 2. Multimeter AN/PSM6 or equivalent. 3. Utilities tool kit. 4. Shower facility. 5. Shave stand.
Learning Objective:	Trainee will have basic knowledge on how to set up, perform operational tests, service/periodic maintenance, troubleshoot and repair the Shower Unit and Shave Stand.
Samples of Behavior:	Trainee will be able to set up, perform operational tests, service/periodic maintenance, troubleshoot, and repair the Shower Unit and Shave Stand.
Notes:	
1. To successfully complete this element, the steps must be followed exactly--no exceptions. 2. Any safety violation is an automatic failure.	

SET UP / PERFORM OPERATIONAL TESTS / SERVICE/PERIODIC MAINTENANCE / TROUBLESHOOT / REPAIRS OF THE PORTABLE SHOWER UNIT & SHAVE STAND

1. Background: A hot shower and shave while deployed can boost morale. It will be up to you to ensure the shower facilities and shave stands are set up and maintain correctly during the deployment. One complete shower and shave unit supports up to 275 people.

1.1. Shower Unit.

1.1.1. Set Up/Perform Operational Tests. Each bare base shower consists of a base assembly with two stalls, a top frame assembly with attached showerheads, side supports, and a fabric cover. Six shower units are joined to make a 12-man facility. Doors are provided to close in the two open ends of the facility. Electrically powered pumps provide water supply and drainage. The shower facility is housed in a temper tent.

1.1.2. Service/Periodic Maintenance. To keep the shower operational you need to perform daily, weekly, monthly, and quarterly inspections on the units. Any defects found needs to be corrected prior to shower use.

1.1.3. Troubleshoot/Repairs. As with anything manmade, problems will occur periodically. When they happen, it will be up to you to correct these problems. Using the manufacturer's instructions will help you quickly troubleshoot the problem and then make necessary repairs.

1.1.3.1. Since troubleshooting is a step-by-step procedure, the effectiveness depends on how much you know about the equipment and how much you think while working. The ability to troubleshoot depends on your capability to think and apply knowledge. To troubleshoot effectively, you must follow a systematic procedure. First, study the symptoms of the trouble thoroughly and ask yourself these questions:

1.1.3.1.1. What were the warning signs preceding the trouble?

1.1.3.1.2. What recent repair has been done?

1.1.3.1.3. Has a similar trouble occurred before?

1.1.3.2. Next, follow the basic troubleshooting process:

1.1.3.2.1. Perform an operational check.

1.1.3.2.2. Analyze the malfunction.

1.1.3.2.3. Locate the malfunction.

1.1.3.2.4. Perform corrective action (repair/replace).

1.1.3.2.5. Perform an operational check.

1.2. Shave Stand.

1.2.1. Set Up/Perform Operational Tests. Each bare base shave stand consists of a base unit with 3 sinks, a mirror back with 3 mirror surfaces with electric light and 115 VAC outlet, a wiring harness to connect the shave stand to a local/bare base power source, and hoses to connect the shave stand plumbing to local/Bare base water supply and drain sources. Four shave stand assemblies are provided for each bare base shower/shave facility. The four shave stands provide shave/basin facilities for 12 personnel at one time. The shave stands are configured around the bare base shower facility in a temper tent.

1.2.2. Service/Periodic Maintenance. To keep the shave stand operational you need to perform daily, weekly, monthly, and quarterly inspections on the units. Any defects found needs to be corrected prior to shave stand use.

1.2.3. Troubleshoot/Repairs. As with anything manmade, problems will occur periodically. When they happen, it will be up to you to correct these problems. Using the manufacturer's instructions will help you quickly troubleshoot the problem and then make necessary repairs.

1.2.3.1. Since troubleshooting is a step-by-step procedure, the effectiveness depends on how much you know about the equipment and how much you think while working. The ability to troubleshoot depends on your capability to think and apply knowledge. To troubleshoot effectively, you must follow a systematic procedure. First, study the symptoms of the trouble thoroughly and ask yourself these questions:

1.2.3.1.1. What were the warning signs preceding the trouble?

1.2.3.1.2. What recent repair has been done?

1.2.3.1.3. Has a similar trouble occurred before?

1.2.3.2. Next, follow the basic troubleshooting process:

1.2.3.2.1. Perform an operational check.

1.2.3.2.2. Analyze the malfunction.

1.2.3.2.3. Locate the malfunction.

1.2.3.2.4. Perform corrective action (repair/replace).

1.2.3.2.5. Perform an operational check.

2. Complete the CD-ROM AFQTP 3E4X1 Utilities Systems, Version 1.0, Jul 01: *Shower and Shave Unit* for detailed instructions on set up, operational tests, service/periodic maintenance, troubleshooting, and repairs of the portable shower unit and shave stand. ***After completing the CD-ROM AFQTP see your Unit Education and Training Manager to take the mandatory CerTests #8168, Shower and Shave Unit AFQTP-Lesson1 & 2 and #8169, Shower and Shave Unit AFQTP-Lessons 3, 4, and 5. Trainee must score at least 80% to meet the minimum completion requirement for diamond tasks.***

NOTE:
The review questions for this material are in the above-mentioned CD-ROM.

NOTE TO SUPERVISOR/TRAINER:
We highly recommend that you have the trainee complete the CD-ROM AFQTP 3E4X1, Utilities Systems, Version 1.0, Feb 98: *Bath Unit and Shower Facility (Portable Shower Unit (M1958) and (PBU100))* in conjunction with this AFQTP. Although these units are being replaced with the newer shower units, there are still some units in the Harvest Eagle deployment packages and in use at some deployed areas.

3. If equipment is available, then perform the following for hands-on certification training.

3.1. Bare Base Shower Facility.

3.1.1. Set Up Shower Facility.

Step 1: Locate T.O. 35E35-4-1, Erection, Operation, Storage, Inspection, and Maintenance Instructions Shower Facility Bare Base.

Step 2: Prepare shower facility for use in accordance with (IAW) T.O. 35E35-4-1, Section III, Paragraph 3-4 through 3-7.

Step 3: Set up shower facility IAW T.O. 35E35-4-1, Section III, Paragraph 3-9 through 3-11.

SAFETY:

1. VOLTAGES HAZARDOUS TO LIFE ARE CONTAINED IN SHOWER PUMP ASSEMBLY WIRING HARNESSES. TO ENSURE PROPER GROUNDING WHEN CONNECTING TO OTHER THAN BARE BASE POWER SUPPLY, LOCAL ELECTRICAL POWER MANAGEMENT MUST APPROVE GROUNDING PROCEDURES.

2. HOOKUP OF WATER PUMP POWER CABLE ADAPTER INVOLVES EQUIPMENT WITH HIGH VOLTAGE, WHICH COULD RESULT IN SEVERE ELECTRICAL SHOCK HAZARD. ONLY QUALIFIED PERSONNEL SHALL ATTEMPT HOOKUP OF POWER CABLE ADAPTOR.

3. DO NOT ATTEMPT TO OPERATE THE WATER PUMPS OR M-80 WATER HEATER UNTIL SHOWER EQUIPMENT HAS BEEN INSPECTED AND APPROVED BY SITE SUPERVISOR.

NOTE TO TRAINER:

Consult M-80 Water Heater T.O. 35E-4-27-1 for hook-up and operation procedures of water heater. Recommended that the trainee complete the CD-ROM AFQTP 3E1X1, HVAC/R, Version 1.0, 1 Feb 98: *M-80 Field Boiler* for familiarization.

3.1.2. Shower Facility Operational Tests.

Step 1: Locate T.O. 35E35-4-1, Erection, Operation, Storage, Inspection, and Maintenance Instructions Shower Facility Bare Base.

Step 2: Perform operational checks IAW T.O. 35E35-4-1, Section IV, Paragraph 4-3 thru 4-5.

SAFETY:

SHOWER STALL SURFACES ARE VERY SLIPPERY WHEN WET. USE EXTREME CAUTION TO AVOID INJURY DUE TO LOSS OF FOOTING.

Step 3: Perform plumbing checks IAW T.O. 35E35-4-1, Section V, Paragraph 5-5.

SAFETY:

SHOWER ELECTRICAL CIRCUITS CONTAIN VOLTAGES HAZARDOUS TO LIFE. DE-ENERGIZE AND TAG "DO NOT USE" ALL POWER SOURCES PRIOR TO PERFORMING ANY MAINTENANCE OPERATION.

Step 4: Perform electrical checks IAW T.O. 35E35-4-1, Section V, Paragraph 5-6.

3.1.3. Shower Facility Service/Periodic Maintenance.

Step 1: Locate T.O. 35E35-4-1, Erection, Operation, Storage, Inspection, and Maintenance Instructions Shower Facility Bare Base.

Step 2: Perform daily preventive maintenance IAW T.O. 35E35-4-1, Section V, Paragraph 5-9, Table 5-1.

Step 3: Perform weekly preventive maintenance IAW T.O. 35E35-4-1, Section V, Paragraph 5-9, Table 5-2.

Step 4: Perform monthly preventive maintenance IAW T.O. 35E35-4-1, Section V, Paragraph 5-9, Table 5-3.

Step 5: Perform quarterly preventive maintenance IAW T.O. 35E35-4-1, Section V, Paragraph 5-9, Table 5-4.

3.1.4. Troubleshooting Shower Facility.

NOTE TO TRAINER:

In order for the trainee to accomplish this task, you must build an exercise scenario using the troubleshooting Table 5-5 in T.O. 35E35-4-1. Then have the trainee identify the probable cause and remedy for the trouble.

Step 1: Locate T.O. 35E35-4-1, Erection, Operation, Storage, Inspection, and Maintenance Instructions Shower Facility Bare Base.

Step 2: Trainee is provided equipment and problem scenario in which to perform task.

Step 3: Use five-step process in troubleshooting: (Use the troubleshooting Table 5-5 in T.O. 35E35-4-1 as a guide).

3.1. Perform an operational check.

3.2. Analyze the malfunction.

3.3. Locate the malfunction.

3.4. Perform corrective action.

3.5. Perform an operational check.

3.1.5. Repairing Shower Facility.

NOTE TO TRAINER:

In order for the trainee to accomplish this task, you must build an exercise scenario using the repair procedures provided in T.O. 35E35-4-1, paragraphs 5-11 through 5-21. Then have the trainee perform the repair.

Step 1: Locate T.O. 35E35-4-1, Erection, Operation, Storage, Inspection, and Maintenance Instructions Shower Facility Bare Base.

Step 2: Trainee is provided equipment and problem scenario in which to perform repair task.

Step 3: Perform the repair using the step-by-step procedures outline in T.O. 35E35-4-1, Section V, Paragraph 5-11 through 5-21.

3.2. Bare Base Shave Stand.

3.2.1. Set Up Shave Stand.

Step 1: Locate T.O. 35E35-3-1, Erection, Operation, Storage, Inspection, and Maintenance Instructions Shave Stand Bare Base.

Step 2: Prepare shave stand for use IAW T.O. 35E35-3-1, Section III, Paragraph 3-4 through 3-7.

Step 3: Set up shave stand IAW T.O. 35E35-3-1, Section III, Paragraph 3-8.

SAFETY:

1. VOLTAGES HAZARDOUS TO LIFE ARE CONTAINED IN SHAVE STAND ASSEMBLY WIRING HARNESSES. TO ENSURE PROPER GROUNDING WHEN CONNECTING TO OTHER THAN BARE BASE POWER SUPPLY, LOCAL ELECTRICAL POWER MANAGEMENT MUST APPROVE GROUNDING PROCEDURES.

2. USE CAUTION WHEN OPERATING PIPE CAP LOCKING LEVERS TO AVOID PINCHING FINGERS.

3. HOOKUP OF SHAVE STAND POWER CABLE ADAPTER INVOLVES EQUIPMENT WITH HIGH VOLTAGE, WHICH COULD RESULT IN SEVERE ELECTRICAL SHOCK HAZARD. ONLY QUALIFIED PERSONNEL SHALL ATTEMPT HOOKUP OF POWER CABLES.

3.2.2. Shave Stand Operational Tests.

Step 1: Locate T.O. 35E35-3-1, Erection, Operation, Storage, Inspection, and Maintenance Instructions Shave Stand Bare Base.

Step 2: Perform operational checks IAW T.O. 35E35-3-1, Section IV, Paragraph 4-3.

Step 3: Perform plumbing checks IAW T.O. 35E35-3-1, Section V, Paragraph 5-5.

SAFETY:

SHAVE STAND ELECTRICAL CIRCUITS CONTAIN VOLTAGES HAZARDOUS TO LIFE. DE-ENERGIZE AND TAG "DO NOT USE" ALL POWER SOURCES PRIOR TO PERFORMING ANY MAINTENANCE OPERATION.

Step 4: Perform electrical checks IAW T.O. 35E35-3-1, Section V, Paragraph 5-6.

3.2.3. <u>Shave Stand Service/Periodic Maintenance</u>.

Step 1: Locate T.O. 35E35-3-1, Erection, Operation, Storage, Inspection, and Maintenance Instructions Shave Stand Bare Base.

Step 2: Perform daily preventive maintenance IAW T.O. 35E35-4-1, Section V, Paragraph 5-9, Table 5-1.

Step 3: Perform weekly preventive maintenance IAW T.O. 35E35-4-1, Section V, Paragraph 5-9, Table 5-2.

Step 4: Perform monthly preventive maintenance IAW T.O. 35E35-4-1, Section V, Paragraph 5-9, Table 5-3.

Step 5: Perform quarterly preventive maintenance IAW T.O. 35E35-4-1, Section V, Paragraph 5-9, Table 5-4.

3.2.4. <u>Troubleshooting Shave Stand</u>.

NOTE TO TRAINER:

In order for the trainee to accomplish this task, you must build an exercise scenario using the troubleshooting Table 5-5 in T.O. 35E35-3-1. Then have the trainee identify the probable cause and remedy for the trouble.

Step 1: Locate T.O. 35E35-3-1, Erection, Operation, Storage, Inspection, and Maintenance Instructions Shave Stand Bare Base.

Step 2: Trainee is provided equipment and problem scenario in which to perform task.

Step 3: Use five-step process in troubleshooting: (Use the troubleshooting Table 5-5 in T.O. 35E35-3-1 as a guide.)

3.1. Perform an operational check.

3.2. Analyze the malfunction.

3.3. Locate the malfunction.

3.4. Perform corrective action.

3.5. Perform an operational check.

3.2.5. Repairing Shave Stand.

Step 1: Locate T.O. 35E35-3-1, Erection, Operation, Storage, Inspection, and Maintenance Instructions Shave Stand Bare Base.

Step 2: Trainee is provided equipment and problem scenario in which to perform repair task.

Step 3: Perform the repair using the step-by-step procedures outline in T.O. 35E35-3-1, Section V, Paragraph 5-11 through 5-19.

SET UP / PERFORM OPERATIONAL TESTS / SERVICE/PERIODIC MAINTENANCE / TROUBLESHOOT / REPAIRS OF THE PORTABLE SHOWER UNIT & SHAVE STAND

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE….?	YES	NO
Shower Facility Set Up.		
1. Prepare the shower facility for use IAW T.O. 35E35-4-1		
2. Set up the shower facility IAW T.O. 35E35-4-1		
3. Comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

DID THE TRAINEE….?	YES	NO
Shower Facility Operational Tests.		
1. Perform operational checks IAW T.O. 35E35-4-1		
2. Perform plumbing checks IAW T.O. 35E35-4-1		
3. Perform electrical checks IAW T.O. 35E35-4-1		
4. Did trainee comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

DID THE TRAINEE….?	YES	NO
Shower Facility Service/Periodic Maintenance.		
1. Perform daily inspection IAW T.O. 35E35-4-1		
2. Perform weekly inspection IAW T.O. 35E35-4-1		
3. Perform monthly inspection IAW T.O. 35E35-4-1		
4. Perform quarterly inspection IAW T.O. 35E35-4-1		
5. Did trainee comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

PERFORMANCE CHECKLIST (Continued)

NOTE TO TRAINER:

In order for the trainee to accomplish these tasks, you must build an exercise scenario using the troubleshooting chart (Table 5-5) in T.O. 35E35-4-1. Then have the trainee troubleshoot the problem and apply the correct repair or replacement procedures in accordance with the technical order.

DID THE TRAINEE….?	YES	NO
Troubleshooting/Repairing of Shower Facility.		
1. Check the maintenance record of the equipment		
2. Perform the five basic steps in troubleshooting: 2.1. Perform operational check 2.2. Analyze malfunction 2.3. Locate malfunction 2.4. Perform corrective action 2.5. Perform operational check		
3. Repair/replace the malfunction component IAW T.O. 35E35-4-1		
4. Comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

DID THE TRAINEE….?	YES	NO
Shave Stand Set Up.		
1. Prepare shave stand for use IAW T.O. 35E35-3-1		
2. Set up shave stand IAW T.O. 35E35-3-1		
3. Comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

DID THE TRAINEE….?	YES	NO
Shave Stand Operational Tests.		
1. Perform operational checks IAW T.O. 35E35-3-1		
2. Perform plumbing checks IAW T.O. 35E35-3-1		
3. Perform electrical checks IAW T.O. 35E35-3-1		
4. Comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

PERFORMANCE CHECKLIST (Continued)

DID THE TRAINEE….?	YES	NO
Shave Stand Service/Periodic Maintenance.		
1. Perform daily inspection IAW T.O. 35E35-3-1		
2. Perform weekly inspection IAW T.O. 35E35-3-1		
3. Perform monthly inspection IAW T.O. 35E35-3-1		
4. Perform quarterly inspection IAW T.O. 35E35-3-1		
5. Did trainee comply with all safety requirements		

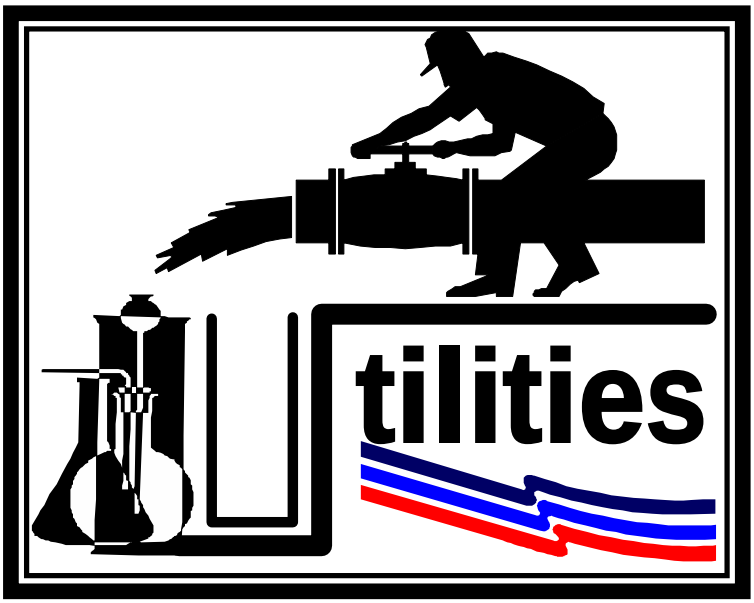
FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

NOTE TO TRAINER:

In order for the trainee to accomplish these tasks, you must build an exercise scenario using the troubleshooting chart (Table 5-5) in T.O. 35E35-3-1. Then have the trainee troubleshoot the problem and apply the correct repair or replacement procedures in accordance with the technical order.

DID THE TRAINEE….?	YES	NO
TROUBLESHOOTING/REPAIRING OF SHAVE STAND.		
1. Check the maintenance record of the equipment		
2. Perform the five basic steps in troubleshooting: 2.1. Perform operational check 2.2. Analyze malfunction 2.3. Locate malfunction 2.4. Perform corrective action 2.5. Perform operational check		
3. Repair/replace the malfunction component I/A/W T.O. 35E35-3-1		
4. Comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.



EXPEDIENT BEDDOWN METHODS

FIELD DEPLOYABLE LATRINE

MODULE 27 **AFQTP UNIT 3**

SET UP (27.3.2.5.1.)

DISASSEMBLE (27.3.2.5.2.)

MAINTAIN (27.3.2.5.3.)

Notice. This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

SET UP, DISASSEMBLE, AND MAINTAIN FIELD DEPLOYABLE LATRINE

Task Training Guide

STS Reference Number/Title:	27.3.2.5.1., Set up field deployable latrine. 27.3.2.5.2., Disassemble field deployable latrine. 27.3.2.5.3., Maintain field deployable latrine.
Training References:	1. CD-ROM, Air Force Qualification Training Package (AFQTP) Utilities Systems, 3E4X1, Version 1.0, Nov 00: *Field Deployable Latrine.* 2. Technical Order (T.O.) 35E35-5-1, *Field Deployable Latrine Assembly*. 3. Air Force Pamphlet (AFPAM) 10-219, Vol. 2, *Preattack and Predisaster Planning.* 4. Field Deployable Latrine and Shower/Shave Unit Video, Pin # 613537. 5. AFPAM 10-219, Vol. 5, *Bare Base Conceptual Planning Guide.*
Prerequisites:	1. **Possess as a minimum a 3E431 AFSC.** 2. **Review the following references:** 2.1. T.O. 35E35-5-1. 2.2. AFPAM 10-219, Vol. 2 & 3. 2.3. Field Deployable Latrine and Shower/Shave Unit Video, Pin # 613537. 3. **Complete CD-ROM, AFQTP Utilities Systems, 3E4X1, Version 1.0, Nov 00: *Field Deployable Latrine.***
Equipment/Tools Required:	1. Computer to support CD-ROM, AFQTP. 2. TV and VCR to support video. 3. Multimeter, Simpson 260 or equivalent. 4. Carpenter's level. 5. Wrench. 6. Utilities Systems tool kit. 7. Pumper truck or trailer.
Learning Objective:	Trainee will have basic knowledge on how to set up, disassemble, and maintain the field deployable latrine.
Samples of Behavior:	Trainee will know the steps involved in setting up, disassembling, and maintaining the field deployable latrine.
Notes:	
1. To successfully complete this element, the steps must be followed exactly--no exceptions. 2. Any safety violation is an automatic failure.	

SET UP, DISASSEMBLE, AND MAINTAIN FIELD DEPLOYABLE LATRINE

1. Background: The field deployable latrine consists of two latrine units (six toilets each), and a pumping unit. The pumping unit consists of an electric motor, centrifugal water pump, check valve, diaphragm pump, pressure switch, and pressure gauge, suction hoses, two supply hoses, and associated fittings. When the electric motor operates, water is drawn from the water tank through the suction hose and check valve and delivered to the latrine units via the supply hoses. The check valve, in conjunction with the pressure switch and diaphragm pump, ensures a constant operating pressure of 20 to 40 pound per square inch (psi). The pressure gauge permits external monitoring of system pressure. The latrine units (two per complete installation) include the six flushable toilets (mounted to the latrine floor), a urinal trough, two sinks, waste tank and base assembly. Sink faucets, urinals, and toilets used on the latrine units are timed devices, dispensing only a measured amount of water with one activation of the push button/valves. (See Figure 1.)

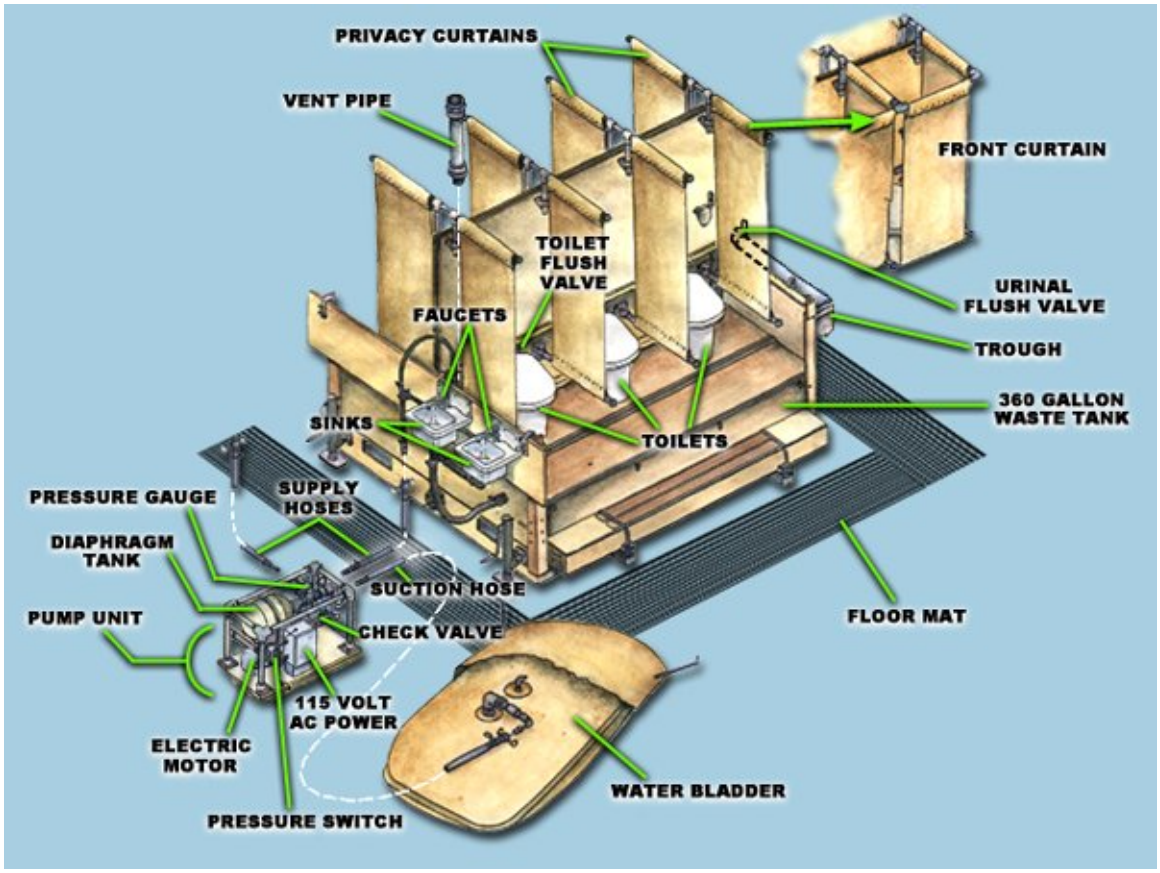


Figure 1. Field Deployable Latrine.

1.1. <u>Set Up</u>. The field deployable latrine is designed for field use and can be set up and used in less than 30 minutes. It is normally set up inside a tent or small building, thus providing some degree of privacy toward the front and rear. Privacy curtains are provided on each side and between adjacent commodes. Latrines must be positioned to allow sufficient access space on each side.

1.2. Disassemble. Disassembly of the field deployable latrine is not as simple as reversing the assembly process. Care should be taken to ensure each item is removed safely while avoiding damage. Cleaning, sanitizing, and storing properly will aid the lifespan of the unit.

1.3. Maintain. For the most part, the field deployable systems will operate with few problems (if maintained properly); however, "Murphy's Law," or "what can go wrong will go wrong," must be considered in the same breadth of mechanical equipment.

2. Complete the CD-ROM, AFQTP 3E4X1 Utilities Systems, Version 1.0, Nov 00: *Field Deployable Latrine* for detailed instructions on setting up, disassembling, and maintaining a field deployable latrine. ***Upon completion of the above-mentioned CD-ROM, see your Unit Education and Training Manager to take the mandatory CerTest #8135, Field Deployable Latrine. Trainee must score at least 80% to meet the minimum completion requirement for diamond tasks.***

NOTE:
The review questions for this material are in the above-mentioned CD-ROM.

3. If equipment is available, then perform the following for hands-on certification training.

3.1. Set-Up Field Deployable Latrine.

Step 1: Locate T.O. 35E35-5-1, Field Deployable Latrine Assembly.

Step 2: Set up field deployable latrine in accordance with (IAW) T.O. 35E35-5-1, Chapter 3, Paragraph 3-1.

Step 3: Perform operational checkout IAW T.O. 35E35-5-1, Chapter 5, Paragraph 5-1.

3.2. Disassemble Field Deployable Latrine.

Step 1: Locate T.O. 35E35-5-1, Field Deployable Latrine Assembly.

Step 2: Disassemble field deployable latrine IAW T.O. 35E35-5-1, Chapter 3, Paragraph 3-2.

3.3. Maintain Field Deployable Latrine.

Step 1: Locate T.O. 35E35-5-1, Field Deployable Latrine Assembly.

Step 2: Perform daily preventive maintenance IAW T.O. 35E35-5-1, Chapter 5, Paragraph 5-2, Table 5-1.

Step 3: Perform weekly preventive maintenance IAW T.O. 35E35-5-1, Chapter 5, Paragraph 5-2, Table 5-1.

Step 4: Perform monthly preventive maintenance IAW T.O. 35E35-5-1, Chapter 5, Paragraph 5-2, Table 5-1.

Step 5: If repairs or replacements of parts is required refer to T.O. 35E35-5-1, Chapter 5, Paragraph 5-4 through 5-6 for instructions.

SET UP, DISASSEMBLE, AND MAINTAIN FIELD DEPLOYABLE LATRINE

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE….?	YES	NO
Set Up Field Deployable Latrine.		
1. Select the correct T.O. for the field deployable latrine		
2. Set up the latrine assembly IAW T.O. 35E5-5-1		
3. Perform an operational check		
4. Comply with all safety requirements		

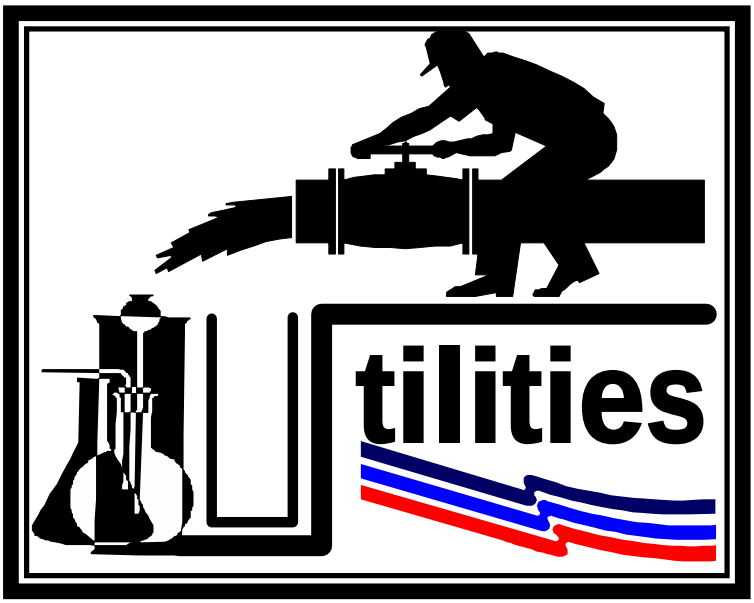
FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

DID THE TRAINEE….?	YES	NO
Disassemble Field Deployable Latrine.		
1. Select the correct T.O. for the field deployable latrine		
2. Disassemble the latrine assembly IAW T.O. 35E5-5-1		
3. Clean and sanitize applicable components		
4. Store each component correctly		
5. Comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

DID THE TRAINEE….?	YES	NO
Maintain Field Deployable Latrine.		
1. Select the correct T.O. for the field deployable latrine		
2. Perform a daily preventive maintenance check IAW T.O. 35E35-5-1		
3. Perform a weekly preventive maintenance check IAW T.O. 35E35-5-1		
4. Perform a monthly preventive maintenance check IAW T.O. 35E35-5-1		
5. Comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.



EXPEDIENT BEDDOWN METHODS

WATER PURIFICATION EQUIPMENT/REVERSE WATER OSMOSIS WATER PURIFICATION UNIT (ROWPU)

MODULE 27 **AFQTP UNIT 3**

SET UP (27.3.2.7.1.)

OPERATE (27.3.2.7.2.)

MAINTAIN (27.3.2.7.3.)

SET UP, OPERATE, AND MAINTAIN ROWPU

Task Training Guide

STS Reference Number/Title:	27.3.2.7.1., Setup ROWPU. 27.3.2.7.2., Operate ROWPU. 27.3.2.7.3., Maintain ROWPU.
Training References:	1. Technical Order (T.O.) 40W4-13-41, *Operator Manual, Water Purification Unit, Reverse Osmosis*. 2. CD-ROM, Air Force Qualification Training Package (AFQTP) Utilities Systems, 3E4X1 Version 1.0, May 97: *Reverse Osmosis Water Purification Unit (ROWPU) System*. 3. ROWPU Operation & Service Video Pin # 614008. 4. Air Force Pamphlet (AFPAM) 10-219, Vol. 5, *Bare Base Conceptual Planning Guide*.
Prerequisites:	1. **Possess as a minimum a 3E431 AFSC.** 2. **Review the following references:** 2.1. T.O. 40W4-13-41. 2.2. ROWPU Operation & Service Video Pin # 614008. 2.3. AFPAM 10-219. 3. **Complete CD-ROM, AFQTP Utilities Systems, 3E4X1, Version 1.0, May 97: *ROWPU System*.**
Equipment/Tools Required:	1. Computer to support CD-ROM AFQTP. 2. TV and VCR to support video. 3. Utilities Systems tool kit.
Learning Objective:	Trainee will have basic knowledge on how to set up, operate, and maintain a ROWPU.
Samples of Behavior:	Trainee will know the steps involved in setting up, operating, and maintaining the ROWPU.
Notes:	
1. To successfully complete this element, the steps must be followed exactly--no exceptions. 2. Any safety violation is an automatic failure.	

SET UP, OPERATE, AND MAINTAIN ROWPU

1. Background: The Reverse Osmosis Water Purification Unit (ROWPU) is a deployable water treatment facility designed to provide potable water to an air wing in field conditions. The ROWPU can produce potable water from nearly any water source, including seawater. Raw water is pumped from the raw water bladders to the treatment complex. After treatment, potable water is then pumped to the potable water storage bladders. It provides purified water for, showers, laundries, and kitchens. (See Figure 1.)

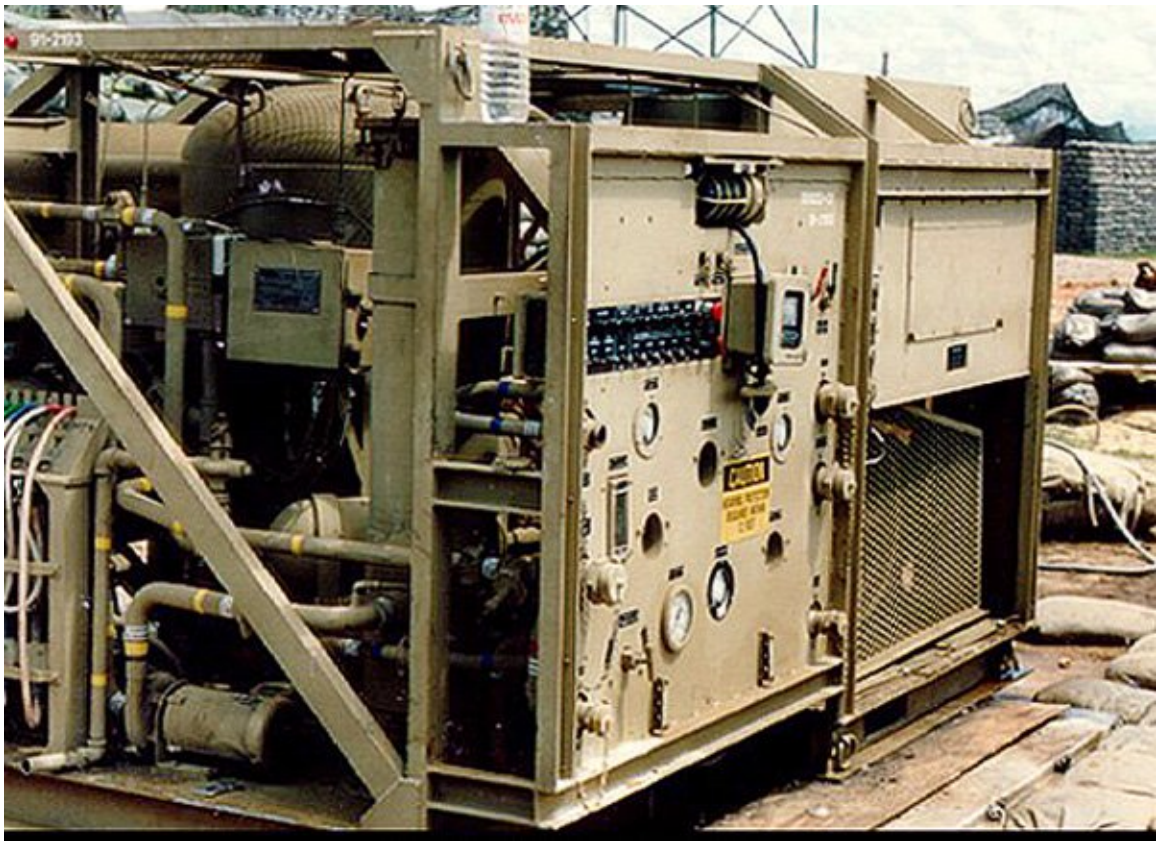


Figure 1. Reverse Osmosis Water Purification Unit (ROWPU) WPES-20 Model

1.1. <u>Set Up ROWPU</u>. There are three models of the ROWPU. These model are designed as followed:

1.1.1. Model WPES-10 for the Army.

1.1.2. Model WPES-20 for the Air Force.

1.1.3. Model-WPES-30 for the Navy.

1.1.4. Major differences between the three models are described below.

1.1.4.1. Only Model WPES-10 is mounted on a flatbed cargo trailer. A self-contained 30kw generator set is installed on the trailer supplies electrical power for operation of the unit. Models WPES-20 and WPES-30 are skid mounted (no trailer).

1.1.4.2. Both models WPES-20 and WPES-30 get electrical power from an external source that is not supplied with the unit.

1.1.4.2.1. Differences in the electrical systems are:

1.1.4.2.1.1. Models WPES-10 and WPES-30 have only one external power connector on the junction box. Internal wiring between these two models is identical.

1.1.4.2.1.2. Model WPES-20 has two external power connectors on the junction box. One connector supplies power to the high-pressure pump (R.O. pump) motor, the other supplies power to remaining system components. Both power cords must be connected to operate the unit. Internal wiring is different between this unit and models WPES-10 and WPES 30.

1.1.4.2.2. Differences in the piping systems are:

1.1.4.2.2.1. Piping on models WPES-20 and WPES-30 is identical. On both models, the R.O. elements must be removed from both front and back ends of the R.O. pressure tubes.

1.1.4.2.2.2. The 30kw generator set installed on the flatbed cargo trailer of Model WPES-10 prevents removal of the R.O. elements from the back of the R.O. vessels. Piping is different on this model to allow removal of all R.O. elements from the front ends of the R.O. pressure tubes.

1.2. Operate ROWPU. In order to operate a ROWPU there must be a raw water source capable of furnishing enough water to supply the number of personnel for the amount of time that they are deployed to the location.

1.3. Maintain ROWPU: To prevent the ROWPU from malfunctioning, you must occasionally maintain it. Various maintenance tasks need to be scheduled according to the amount of time the unit has been in operation. It will be up to you, the operator, to ensure these maintenance tasks are accomplished, to keep the ROWPU running efficiently.

2. Complete the CD-ROM, AFQTP 3E4X1 Utilities Systems, Version 1.0, May 97: *Reverse Osmosis Water Purification System* for detailed instructions on setting up, operating, and maintaining a ROWPU. ***Upon completion of the above-mentioned CD-ROM, see your Unit Education and Training Manager to take the following mandatory CerTests. Trainee must score at least 80% to meet the minimum completion requirement for diamond tasks.***

	Test #	Title
Set Up ROWPU	8037	ROWPU Qualification Training Package Lesson 1
	8038	ROWPU Qualification Training Package Lesson 2
Operate ROWPU	8039	ROWPU Qualification Training Package Lesson 3
Maintain ROWPU	8040	ROWPU Qualification Training Package Lesson 4
	8041	ROWPU Qualification Training Package Lesson 5
	8042	ROWPU Qualification Training Package Lesson 6

NOTE:
The review questions for this material are in the above-mentioned CD-ROM.

3. If equipment is available, then perform the following for hands-on certification training.

3.1. Set Up ROWPU.

Step 1: Locate T.O. 40W4-13-41, Operator Manual, Water Purification Unit, Reverse Osmosis.

Step 2: Set up ROWPU in accordance with (IAW) T.O. 40W4-13-41, Chapter 2, Section III, Paragraph 2-7.

Step 3: Perform initial checks and adjustment IAW T.O. 40W4-13-41, Chapter 2, Section III, Paragraph 2-8.

3.2. Operate ROWPU.

Step 1: Locate T.O. 40W4-13-41, Operator Manual, Water Purification Unit, Reverse Osmosis.

Step 2: Operate ROWPU IAW T.O. 40W4-13-41, Chapter 2, Section III, Paragraph 2-9 through 2-15.

Step 3: Operating ROWPU under unusual conditions refer to T.O. 40W4-13-41, Chapter 2, Section IV for:

3.1. Extreme cold refer to paragraph 2-21.

3.2. Extreme heat refer to paragraph 2-22.

3.3. Dusty and sandy areas refer to paragraph 2-23.

3.4. Rainey and damp areas refer to paragraph 2-24.

3.5. Saltwater areas refer to paragraph 2-25.

3.6. Nuclear, biological, or chemical contaminated areas refer to paragraph 2-26.

3.3. Maintain ROWPU.

Step 1: Locate T.O. 40W4-13-41, Operator Manual, Water Purification Unit, Reverse Osmosis.

Step 2: Perform BEFORE operating preventive maintenance checks and services (PMCS) IAW T.O. 40W4-13-41, Chapter 2, Section II, Paragraph 2-4, 2-5, and Table 2-2.

Step 3: Perform DURING PMCS IAW T.O. 40W4-13-41, Chapter 2, Section II, Paragraph 2-4, 2-5, and Table 2-2.

Step 4: Perform AFTER PMCS IAW T.O. 40W4-13-41, Chapter 2, Section II, Paragraph 2-4, 2-5, and Table 2-2.

Step 5: Perform WEEKLY PMCS IAW T.O. 40W4-13-41, Chapter 2, Section II, Paragraph 2-4, 2-5, and Table 2-2.

Step 6: Perform MONTHLY PMCS IAW T.O. 40W4-13-41, Chapter 2, Section II, Paragraph 2-4, 2-5, and Table 2-2.

Step 7: If repairs or replacements of parts is required refer to T.O. 40W4-13-41, Chapter 3, Section II, Paragraph 3-4, Table 3-2 for troubleshooting and Chapter 3, Section III, Paragraph 3-4 through 3-11 for replacement procedures.

Step 8: Document all maintenance action on equipment form.

SET UP, OPERATE, AND MAINTAIN ROWPU

PERFORMANCE CHECKLIST

INSTRUCTIONS:
The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE….?	YES	NO
Set Up ROWPU.		
1. Locate the applicable T.O. for the ROWPU		
2. Set up the water purification system IAW T.O. 40W4-13-41		
3. Perform the initial checks and adjustment		
4. Comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

DID THE TRAINEE….?	YES	NO
Operate ROWPU.		
1. Locate the applicable T.O. for the ROWPU		
2. Operate ROWPU by: 2.1. Apply electrical power correctly 2.2. Start raw water pump # 1 correctly 2.3. Start raw water pump # 2 correctly 2.4. Start chemical feed pump correctly 2.5. Adjust chemical feed pump correctly 2.6. Vent multimedia filter correctly 2.7. Start booster pump correctly 2.8. Start R.O. pump correctly 2.9. Examine clarity of filtered water correctly 2.10. Make final adjustment (if needed) 2.11. Fill backwash (brine) tank correctly 2.12. Fill product water tanks correctly 2.13. Maintain polymer dosage correctly 2.14. Maintain chlorine dosage correctly 2.15. Distribute water correctly 2.16. Monitor R.O. pump pressure correctly		
3. Backwash multimedia filter correctly		
4. Apply citric acid correctly (if required)		
5. Clean R.O. element correctly		

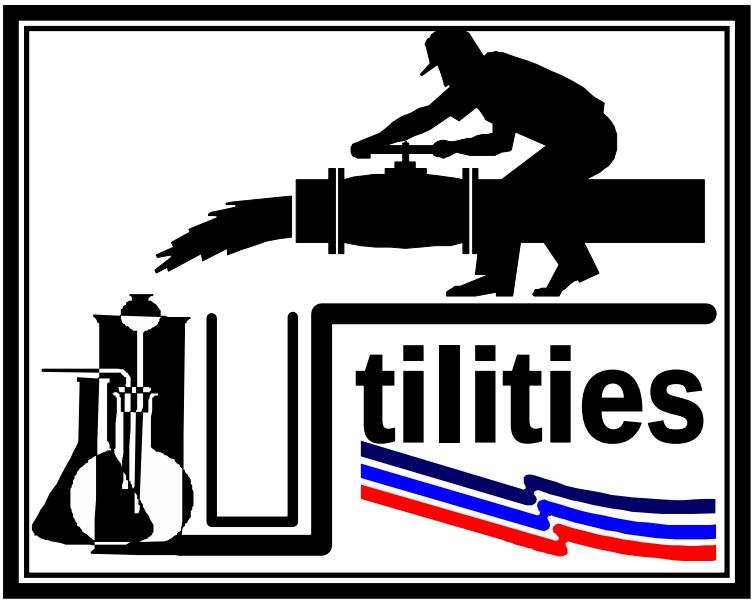
PERFORMANCE CHECKLIST (Continued)

6. Apply correct shutdown procedures for: 6.1. Normal (less than 24 hours in operation) 6.2. Extended (operation for 72 hours or more)		
7. Operate auxiliary equipment correctly		
8. Correctly operated ROWPU under extreme cold conditions (if applicable)		
9. Correctly operated ROWPU under extreme heat conditions (if applicable)		
10. Correctly operated ROWPU under dusty and sandy conditions (if applicable)		
11. Correctly operated ROWPU under rainy and damp conditions (if applicable)		
12. Correctly operated ROWPU under saltwater conditions (if applicable)		
13. Correctly operated ROWPU under nuclear, biological, or chemical conditions (if applicable)		
14. Comply with all safety requirements		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

DID THE TRAINEE….?	**YES**	**NO**
Maintain ROWPU.		
1. Locate the applicable T.O. for the ROWPU		
2. Perform **before** PMCS IAW T.O. 40W4-13-41		
3. Perform **during** PMCS IAW T.O. 40W4-13-41		
4. Perform **after** PMCS IAW T.O. 40W4-13-41		
5. Perform **weekly** PMCS IAW T.O. 40W4-13-41		
6. Perform **monthly** PMCS IAW T.O. 40W4-13-41		
7. Repair/replaced parts IAW T.O. 40W4-13-41		
8. Document all maintenance action on equipment form		
9. Did trainee follow all the safety procedures		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.



SURVIVABILITY SUPPORT

WATER SUPPLY

MODULE 27 **AFQTP UNIT 4**

CONDUCT WATER TESTING USING A M272 WATER TEST KIT, CHEMICAL AGENTS (27.4.2.)

CONDUCT WATER TESTING USING A M272 WATER TEST KIT FOR CHEMICAL AGENTS

Task Training Guide

STS Reference Number/Title:	27.4.2., Conduct Water Testing Using A M272 Water Test Kit, Chemical Agents
Training References:	CD-ROM, Air Force Qualification Training Package (AFQTP) Utilities Systems, 3E4X1 Version 1.0, Dec 01: *M272 Water Testing Kit, Chemical Agents*.
Prerequisites:	1. **Possess as a minimum a 3E431 AFSC.** 2. **Complete CD-ROM, AFQTP Utilities Systems, 3E4X1, Version 1.0, Dec 01: *M272 Water Test Kit, Chemical Agents*.**
Equipment/Tools Required:	1. Computer to support the CD-ROM, AFQTP. 2. M-272 Water Testing Kit.
Learning Objective:	Trainee will have basic knowledge on how to conduct water testing with a M272 Water Testing Kit.
Samples of Behavior:	Trainee will know the steps involved testing water using the M272 Water Test Kit.
Notes:	
1. To successfully complete this element, the steps must be followed exactly--no exceptions. 2. Any safety violation is an automatic failure.	

CONDUCT WATER TESTING USING A M272 WATER TEST KIT FOR CHEMICAL AGENTS

1. Background: Availability of high quality drinking water to deployed personnel has a substantial impact on maintaining them in optimum health and readiness. The impact of poor quality water can range from diminished performance of the deployed personnel to serious acute and chronic health effects on the exposed population. The M272 Water Testing Kit has the capability to provide very accurate and specific analytical data, regarding the presence of certain chemical agents in a water source. This qualification training package includes instructions on how to safely and accurately perform four chemical agent tests: nerve agent, blister agent, blood agent, and lewisite. Also included in the program are specific safety precautions, as well as a thorough description of the chemical and physical kit components used for testing procedures. Whether in a post-attack scenario, terrorist incident, or a chemical industrial accident, information about chemical contamination can be vital for overall threat analysis; competency with the M272 Water Testing Kit could save the day.

2. Complete the CD-ROM, AFQTP 3E4X1 Utilities Systems, Version 1.0, Dec 01: ***Water*** *Testing Using a M272 Water Testing Kit, Chemical Agents* for detailed instruction on how to conduct tests***. Upon completion of the above-mentioned CD-ROM, see your Unit Education and Training Manager to take the mandatory CerTests # 8214 through # 8220, M-272 Water Testing Kit AFQTP – Lesson 1-7. Trainee must score at least 80% on each test to meet the minimum completion requirement for diamond tasks.***

> **NOTE:**
> The review questions for this material are in the above-mentioned CD-ROM.

3. If the testing kit is available, then perform the following for hands-on certification training.

3.1. Test 1 – Lewisite.

Step 1: Break off both ends of a BLUE band tube. Insert tube *prongs up* into connector on stopper.

Step 2: Fill bottle to mark with water to be tested.

Step 3: Add zinc mix from ORANGE label packet. Insert stopper assembly *firmly* into bottle.

Step 4: Do Test 2 – Nerve Agent before going to Step 5.

Step 5: Check BLUE band tube and see Step 6.

5.1. If water is below 50^{o} F and beads are YELLOW or BROWNISH, see Step 6.

5.2. If beads remain WHITE, heat bottom of bottle with match. Wait 5 minutes.

Step 6: Compare color of beads with Lewisite Test Colors:

6.1. YELLOW or BROWNISH beads mean – DANGER – Lewisite.

6.2. All WHITE beads mean – SAFE – No Lewisite.

3.2. Test 2 – Nerve Agent.

Step 1: Tear open WHITE label packet on notched side. Remove silver covered ticket.

Step 2: Fold back loose end of silver cover.

Step 3: Wet white patch with water to be tested.

Step 4: Fold silver cover back over patch and fold ticket. Insert in clip and hold in fist for 3 minutes.

4.1. If water is below 50° F, hold clip between clasped palms.

4.2. Keep hands clasped to heat for 3 minutes by rubbing heels of hands together.

Step 5: Remove ticket from clip and pull silver cover completely off, exposing second patch.

Step 6: Rewet white patch, fold ticket, and press the two patches together. Reinsert in clip and hold in fist for 3 minutes.

6.1. If water is below 50° F, again heat clip in hands as in Step 4 above.

Step 7: Compare colors of patch on end with CLIPPED CORNERS with Nerve Agent Test Colors:

7.1. A WHITE patch means – DANGER – Nerve Agent.

7.2. A BLUE patch, MATCHING or BLUER than test colors means – SAFE – No Nerve Agent.

3.3. Tests 3 (Cyanide)and 4 (Mustard) are run together.

3.3.1. Test 3 – Cyanide.

Step 1: Break off BOTH ends of a BLUE band tube. Insert tube *prongs up* into connector on stopper.

Step 2: Break off BOTH ends of a RED band tube. Attach tube *prongs up* to top of BLUE band tube with a connector.

Step 3: Fill bottle to mark with water to be tested.

Step 4: Immediately add salt mix from YELLOW label packet and carefully swirl bottle to dissolve.

Step 5: Add 2 tablets from GREEN label packet. Insert stopper assembly *firmly* into bottle.

5.1. If water is below 50° F, break up tablets in packet before adding to bottle.

Step 6: Wait a full five minutes. (If colder than 50° F, wait a full 10 minutes.)

CAUTION:

IF WHITE BEADS IN BLUE BAND (BOTTOM) TUBE GET WET, START OVER WITH NEW WATER AND NEW TUBES.

Step 7: Remove RED band (top) tube. Compare color of beads below black portion with Cyanide Test Colors: (If in doubt compare with unused tube.)

7.1. BLUE beads mean – DANGER – Cyanide.

7.2. ALL WHITE beads mean – SAFE – No Cyanide.

7.3. YELLOW beads in BLUE band (lower) tube also mean – DANGER – Cyanide.

3.1.2. <u>Continue procedure for Test 4 – Mustard.</u>

Step 8: Remove BLUE band tube. Insert tube into tube holder of heater.

Step 9: Insert heater into socket inside case top. Swing out windshield. Turn back of case into wind.

Step 10: Heat tube holder with flame of one match. Wait 30 seconds after heating.

Step 11: Remove BLUE band tube from tube holder. Squeeze ¼ inch of alkaline solution into tube end *<u>not</u>* having prongs.

Step 12: Compare color of beads with Mustard Test Colors: (Ignore any TAN color.)

12.1. PURPLE beads mean – DANGER – Mustard.

12.2. ALL WHITE (or TAN) beads mean – SAFE – No Mustard.

SAFETY:

RINSE ALL APPARATUS IN CLEAN WATER BEFORE REPACKING KIT. SAFELY DISPOSE OF ALL USED WRAPPING/MATERIALS.

CONDUCT WATER TESTING USING A M272 WATER TEST KIT FOR CHEMICAL AGENTS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

DID THE TRAINEE….?	YES	NO
1. Perform water test for Lewisite correctly		
2. Perform water test for Nerve Agent correctly		
3. Perform water test for Cyanide correctly		
4. Perform water test for Mustard correctly		
5. Comply with all the safety requirements		
6. Rinse all apparatus in clean water before repacking kit		
7. Dispose of all used wrappings/materials correctly		

FEEDBACK: Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

MEMORANDUM FOR HQ AFCESA/CEOF
139 Barnes Drive Suite 1
Tyndall AFB, FL 32403-5319

FROM:

SUBJECT: Qualification Training Package Improvement

1. Identify module.

   Module # and title_____

2. Identify improvement/correction section(s):

   _____ STS Task Reference
   _____ Training Reference
   _____ Evaluation Instructions
   _____ Performance Resources
   _____ Steps in Task Performance
   _____ Performance Checklist
   _____ Feedback
   _____ Format
   _____ Other

3. Recommended changes--use a continuation sheet if necessary.

   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

4. You may choose to call in your recommendations to DSN 523-6392 or FAX DSN/Commercial 523-6488 or (850) 283-6488 or email ceof.helpdesk@tyndall.af.mil.

5. Thank you for your time and interest.

YOUR NAME, RANK, USAF
Title/Position